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FAMILY LYCEUM.

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VOLCANOES.

ETNA.

TOUCHING the fore-runners of this fire, there was, for the space of eighteen days, before it broke out, a very thick dark sky in those parts, with thunder and lightning, and frequent concussions of the earth, which the people make terrible reports of, though I never saw nor heard of any buildings cast down thereby, save a small town or village, called Nicolosi, about half a mile distant from the new mouth, and some such other slight buildings among those towns, that were after overrun by the fire. Besides, it was observed that the old top or mouth of Etna did, for two or three months before, rage more than usual; the like of which did Volcan and Stromboli, two burning mountains to the westward. And the top of Etna must about the same time have sunk down into its old vorago or hole, in that 'tis agreed by all, that had seen this mountain before, that it was very much lowered. Other fore-runners of this fire I have not heard nor met with.

It first broke out on the eleventh of March, 1669, about two hours before night, and that on the south-east side or skirt of the mountain, about twenty miles beneath the old mouth; and ten miles from Catania. At first it was reported to advance three miles in twenty-four hours; but at our being there, (viz. April 5,) when we were come within a short mile of Catania, it scarce moved after the rate of a furlong a day; and after this degree of progress it continued for fifteen or twenty days after, passing under the walls of Catania a good way into the sea; but about the latter end of this month, and the beginning of May, (whether it was that the sea could not receive this matter fast enough, or rather that the mouth above did cast forth a larger quantity,) it bent all its force against the city; and having wrought itself up even with the walls thereof, over it passed in divers places; but its chief fury fell upon a very stately convent, which was that of the Benedictines, having large gardens and other ground betwixt them and the wall: which when it had filled up, it fell with all its force on the convent, where it met with strong resistance, which made it swell (as usually it did where it met with any obstruction) almost as high as the higher shops in the old London exchange, this convent being built much after that fashion, though considerably bigger. Some parts of this wall were driven in, whole and entire, almost a foot, as appeared by the rising of the tiles in the midst of the floor, and bending of the iron bars that went cross above. And 'tis certain, had this torrent fallen in some other part of the town, it would have made great havoc amongst their ordinary buildings, but here its fury ceased the 4th of May, running henceforward in little channels or streams, and that chiefly into the sea. It had overwhelmed in the upland country some fourteen towns and villages, whereof some were of good note, containing three or four thousand inhabitants, and stood in a very fruitful and pleasant country, where the fire had never made any devastation before; but now there is not so much as any sign where such towns have stood; only the church and steeple of one of them, which stood alone upon a high ground, does still appear.

As to the matter which thus ran, it was nothing else but divers kinds of metals and minerals, rendered liquid by the fierceness of the fire in the bowels of the earth, boiling up and gushing forth, like the water doth at the head of some great river; and having run in a full body for a good stone's cast or more, the extremities thereof began to crust and curdle, becoming, when cold, those hard porous stones, which the people call Sciarri, having the nearest resemblance to huge cakes of sea-coal, full of a fierce fire. These came rolling and rumbling over one another, and where they met with a bank, would fill up and swell over, by their weight bearing down any common building, and burning up what was combustible. The chief motion of this matter was forward, but it was also dilating itself, as a flood of water would do on even ground, thrusting out several arms, or tongues, as they call them.

About two or three of the clock in the night, we mounted an high tower in Catania, whence we had a full view of the mouth; which was a very terrible sight, viz. to see so great a mass or body of mere fire. Next morning we would have gone up to the mouth itself, but durst not come nearer than a furlong off, for fear of being overwhelmed by a sudden turn of the wind, which carried up into the air some of that vast pillar of ashes, which to our apprehension exceeded twice the bigness of Paul's steeple in London, and went up in a straight body to a far greater height than that; the whole air being thereabout all covered with the lightest of those ashes blown off from the top of this pillar: and from the first breaking forth of the fire until its fury ceased, (being fifty-four days) neither sun nor star were seen in all that part.

From the outside of this pillar fell off great quantity of stones, but none very big, neither could we discern any fire in them, nor come to see where that fiery stuff broke out, there being a great bank or hill of ashes betwixt it and us.

At the mouth whence issued the fire, or ashes, or both, was a continual noise, like the beating of great waves of the sea against rocks, or like thunder afar off, which sometimes I have heard here in Messina, though situated at the foot of high hills, and sixty miles off. It hath also been heard one hundred miles northward of this place, in Calabria, (as I have been credibly informed,) whither the ashes have also been carried: and some of our seamen have also reported that their decks were covered therewith at Zante, though it is likely not very thick.

Of those burnt stones, or sciarri, I have some by me of divers qualities, and shall procure what more I can, to be sent by the first passage.

About the middle of May we made another journey thither, where we found the face of things much altered, the city of Catania being three quarters of it compassed round with these sciarri, as high as the top of the walls; and in many places it had broke over. The first night of our arrival, a new stream or gutter of fire broke forth among some sciarri, which we were walking upon an hour or two before, and they were as high as to be even with the top of the wall. It poured itself down into the city in a small gutter of about three feet broad, and nine feet long of mere fire, the extremities still falling off into those sciarri; but this stream was extinct by the next morning, though it had filled up a great void place with its sciarri. The next night was another much bigger channel discovered, pouring itself over another part of the wall into the castle-ditch, which continued (as we were informed) some days after our departure. Divers of these small rivulets did run at the same time into the sea, and it does so still at this very day, though faintly.

It was observed, that those streams of fire never grew broader nor visibly longer, nor moved out of the place they were seen in; which put us a little more to examine their working, and we did conclude, that not only then, but in the fury also of its running, it made itself certain crusted gutters to run in, to keep itself, as it were, from the air, which by degrees did cool and fix it, as more plainly appeared above at the mouth, where, the first time of our going thither, we found the sciarri generally thus cooled and fixed. And hence also it might proceed, that these live sciarri, meeting with any bank or high ground, would puff and swell up, till they had overcome it; so that in many places, especially under the walls of Catania, were valleys of those sciarri, and the fire never broke forth, or discovered itself in those streams, until it had gained its height; for those rivulets ever went declining.

Having spent a couple of days about Catania, we again went up to the mouth, where now without any danger of fire or ashes we could take a free view both of the old and new channel of the fire, and of that great mountain of ashes cast up. That, which we guessed to be the old bed or channel, was a three-cornered plot of about two acres, with a crust of sciarri at the bottom, and upon that a small crust or surface of brimstone.—It was hedged in on each side with a great bank or hill of ashes, and behind and at the upper end rose up that huge mountain of the same matter. Between those two banks the fire seems to have had its passage. At the upper end in the nook upon a little hillock of crusted sciarri was a hole about ten feet wide, whence 'tis probable the fire issued; and it might have had several other such holes, since either crusted over or covered with ashes. At the bottom of this hole the fire was seen to flow along, and below it was a channel of fire, beneath that surface of sciarri, which being cleft atop for some space, we had an easy and leisurable view of the metal flowing along, whose superficies might be a yard broad, though possibly it carried a greater breadth underneath, the gutter going sloping. What depth it had, we could not guess: it was impenetrable by iron hooks and other instruments we had. We were very desirous to have got some of this matter at the spring head, but we could penetrate no more into it, than with one's finger into the palm of the hand. 'Tis likely that some running may have been more yielding than we found this. From this channel, but especially from that hole above it, issued great store of a strong sulphureous smoke, wherewith some of our companions were at first almost stifled through inadvertency. About once in a quarter of an hour there would rise a pillar of smoke or ashes, but nothing comparable to the former; which seemed to come from the middle top of that new-made mountain. I confess, it was an omission in us, not to go up to this mountain, being so near; but because it was troublesome, and not without danger, the rest of the company being satisfied with what they had already seen, would not stay to see any more.

At this our last being in Catania, we found the people busy in barricading the ends of some streets and passages, where they thought the fire might break in; and this they did by pulling down the old houses thereabout, and laying up the loose stones in manner of a wall, which they said would resist the fire, as not being mixed with lime; though it was the great weight and force of that fiery matter in pressing forward, and not its burning, that overthrew the buildings, as plainly appeared in the convent of the Benedictines, and in the town-walls, where the great deluge of fire did pour itself; it not breaking into the city, but pouring itself over the walls, as hath been said.

Unto this very time 'tis said to have run a mile into the sea, and as much in front, though it was much less when we were there. The shore goes gently declining, having at the extremity of the sciarri about five fathoms, and about half as much they are above water.

The superficies of the water for twenty feet or more of those rivulets of fire, was hotter than to endure one's hand in it, though deeper it was more temperate, and those live sciarri still retained their fire under water, as we saw when the surges of the sea retreated back in their ordinary reverberations.

The general face of these sciarri is in some respect not much unlike, from the beginning to the end, to the river of Thames in a great frost, at the top of the ice above bridge, I mean, lying after such a rugged manner in great flakes: but its color is quite different, being most of a dark dusky blue, and some stones or rocks of a vast bigness, close and solid.

But notwithstanding their ruggedness, and store of fire which we could see glowing in the clefts and cavities, we made a shift to ramble over a good part of them; as it is said also that people would do the same in its greatest violence of burning. For as those live sciarri, and those rivers of fire themselves were so tough and impenetrable as to bear any weight, so the superficies of the sciarri might be touched and handled, the fire being inward, and not to be discerned but near hand, especially in the day-time: and it was somewhat a strange sight to see so great a river come so tamely forward; for, as it approached unto any house, they not only at good leisure removed their goods, but the very tiles and beams, and what else was moveable.

'Tis observable, that none of those that went to see it, when there was little else to be seen but the cold sciarri, but declared to have found it a much other thing than they imagined, though related to them *viva voce* by those who had formerly been there.

I shall add, that the whole country from the very walls of Catania to twenty miles on this side, is full of old sciarri, which former eruptions have cast forth, though the people remember none so big as this last, or that burst out so low. This country is notwithstanding well cultivated and inhabited; for length of time hath either mollified much of those old sciarri, or new mould or ashes have overgrown them, though there still remains much country which it may be will never be made serviceable.

What is the perpendicular height of this mountain I cannot learn. It cannot perhaps be rightly taken, being subject to alter its height and shape. But it is a very goodly mountain to look upon, as one passes by sea to the eastward, standing alone by itself, rising from the very shore; and at shortest passage is reckoned twenty miles up to the top, though from Catania it hath thirty miles as before.—[*Tour of a Traveller.*

DESCRIPTION OF A GLORY SEEN ON MOUNT RHEALT.

ON the 13th of February, 1780, as I was returning to Chester, and ascending, at Rhealt, the mountain which forms the eastern boundary of the Vale of Clwyd, I observed a rare and curious phenomenon. In the road above me, I was struck with the peculiar appearance of a very white shining cloud, that lay remarkably close to the ground. The sun was nearly setting, but shone extremely bright. I walked up to the cloud, and my shadow was projected into it. The head of my shadow was surrounded, at some distance, by a circle of various colors, whose centre appeared to be near the situation of the eye, and whose circumference extended to the shoulders.—This circle was complete, except what the shadow of my body intercepted. It exhibited the most vivid colors, red being outermost. As far as can be recollected, all the colors appeared in the same order and proportion that the rainbow presents to our view. It resembled, very exactly, what in pictures is termed a GLORY, around the head of our Saviour and of saints—not indeed that luminous radiance, which is painted close to the head, but an arch of concentrate colors, which is placed separate and distinct from it. As I walked forward, this glory approached or retired, just as the inequality of the ground shortened or lengthened my shadow. The cloud being sometimes in a small valley below me, sometimes on the same level, or on higher ground, the variation of the shadow and glory became extremely striking and singular.

To add to the beauty of the scene, there appeared, at a considerable distance, to the right and left, the arches of a white shining bow. These arches were in the form of, and broader than a rainbow; but were not completely joined into a semicircle above, on account of the shallowness of the cloud. When my chaise came up, I could observe no peculiar appearance round the shadows of the postillion, horses, or chaise. But the postillion was alarmed, to an uncommon degree, by this very singular apparition, which indeed might excite terror or delight in the beholder, according to the disposition of mind with which it was viewed.—[*Gallery of Nature & Art.*

SIMPLICITY.

IN a former number we presented to our readers some suggestions on the *simplicity of science*—of physical, intellectual and moral science. We advanced the idea that the simplicity of nature and of the gospel, constituted the beauty, the dignity, and the power of both. We have been gratified to find, that these views have so far attracted the attention of numerous editors, as to give them a place in their columns. The person who first extracted it from the Lyceum, would have conferred a still greater obligation upon us, without any injury to himself, by giving credit for the article; especially as others would in that case have been likely to give credit also. We might ask a similar favor respecting numerous pieces which were the result of our own reflections.—We take the liberty on this occasion to refer to an article accompanied with a cut which cost us several dollars, which was sent to a neighboring city, and used in one paper, without an acknowledgment either of the article, the substance of which used, or the cut. Our object is not to complain, but to ask an additional favor from some of our friends, to whom we are already under obligations.

With this digression from our subject, we wish to advance another thought intimately connected with those just referred to. We wish to assert the fact, which every one

will of course be ready to acknowledge that the power and efficiency of *measures*, especially those for the advancement of education, depend upon their simplicity. The power and success of every machine for physical effects, depends more than upon any thing else perhaps, upon its simplicity of construction and of its operations. The same fact is still more striking and important in intellectual and moral machinery.—And it is a subject of deep regret, that in nine attempts out of ten to promote science or religion, a great mistake is committed in overlooking or disregarding the natural, simple and easy measures to effect the object, in view of those that are more imposing, and attended with greater formality or parade. Those concerned seem to forget or disregard the simple bounties of Providence which are necessary and ample for sustaining life, in view of some splendid feast, which at a future and distant period is to be prepared at great cost and array.

Many societies seem to think, at least to act, as if an annual lecture would answer the purposes of education, or as if it would of itself educate the community. The measures of some societies seem to look as if it was supposed that the appointment of Vice Presidents in all the states, especially if they should be governors or others high in authority, will teach children Arithmetic and Geography.

Now it is evident that a glance at an artificial globe, or even an apple, will learn a child more about geography, than an annual course of lectures, on the theory of education a hundred miles from him, for a century; or than the appointment of a vice President of a literary society in every state and territory in the Union, even if they should all be governors. The meeting of half a dozen teachers, to make known to each other their several modes of teaching, with their results, objections, &c., which can be done by thousands on almost any evening, by travelling two or three miles, would be likely to give them more real practical improvement in their profession, than they might get by travelling a hundred miles, and spending half as many dollars to hear a course of elaborate lectures on the general subject of education.

Measures and operations of an imposing and formal character, frequently do hurt rather than good, by calling attention from those which are the soul and life of education, or any thing to which they relate. There may be, and lamentable to tell, there often is, so much parade and show in the pretended worship of our Creator, as to swallow up and entirely obliterate every humble pious feeling of the heart. Is it not true at this moment, that thousands in almost every denomination of christians, especially if it is numerous, have nearly or wholly lost their personal piety, which is the only piety we can conceive of, in the ceremony, form and parade of the mass? Is it not true, that half a dozen humble devoted christians in some lonely, uncultivated forest with nothing but the volumes of inspiration, and of nature to instruct them, may imbibe more largely the spirit of their master, than is often shown by those participating in the pomp of ceremony, and in the fashion of religion in a large city?

We feel, and feel deeply and sensibly, that if the world is ever made wiser or better, it must be by the simplicity of science and the simplicity of the gospel. We believe, and we are confident in our belief, that the only measures capable of advancing the simple, beautiful, animating principles of science, and of the gospel, are as simple as the principles themselves. We believe, that if the simple, natural, means of acting upon mind and heart, are strictly adhered to, and vigorously pursued, our world may be made both wiser and better, and that speedily—that many upon the four quarters of our globe, and in the islands of the sea, may be made to receive and to feel, the beautiful and animating principles of the science of nature, and the science of the gospel—of the science of matter, and the science of mind—of the science of intellect and the science of heart.

Sure we are, that there is not a rational being upon the face of our globe, who ought not, and who may not make daily progress in the science of *himself*, which embraces the whole circle of the science of matter, of intellect and of heart. Which of our readers is not willing, and ready, to engage in the great and glorious cause of rendering himself, and the whole race to which he belongs, more happy, and more worthy of their nature, and of their God? Who does not wish for the universal diffusion of the science of Nature and of Christianity? And whose aid is not necessary for its accomplishment?

FAMILY INSTRUCTION.

GEOMETRICAL ALPHABET.

We take the liberty again to invite the attention of parents, and through them, of children, to a geometrical analysis of the alphabet. We do this by means of various questions, which may be put to children, respecting the number and kind of lines and angles, with the position of the former.

Fifteen letters in the alphabet, are composed entirely of straight lines; which are they? Eight letters have one or more horizontal lines; which are they? One letter has three horizontal lines; which is it? In the alphabet are nineteen vertical lines; in which letters are they? One letter is composed of four oblique lines; which is it? One is composed of two vertical and two oblique lines; which is it? One letter is composed of two horizontal lines, and one oblique; which is it? Two letters are composed of two oblique lines each; which are they? Which letter is composed of two vertical, and one oblique lines? which of two oblique and one vertical? which of two oblique and one horizontal?

Four letters are composed entirely of curved lines; which are they? which seven are composed of both straight and curved? How many letters in the alphabet are composed of one line? How many of two; also of three, and of four? How many have vertical lines? how many horizontal? How many and which have parallel lines? Which have right angles, and how many right angles in the whole? How many obtuse angles are there in the alphabet, and in which letters? Which are the most numerous, the acute, right, or obtuse angles?

CHRISTIAN SCIENCE.

The principles of the Christian religion, like the laws of the natural universe, are founded in the eternal nature of things, and one is as unchangeable as the other. No principle but that of attraction could keep a material universe together; none but a principle of love can keep a moral universe together. Introduce the principle of repulsion into the solar system, and all the bodies which compose it must evidently be dispersed, and continue to depart from each other while they continue under the influence of this repulsion. Introduce the principle of hatred and perfect distrust into a moral universe, and all the order, harmony, and happiness among the beings which compose it must be immediately broken up, and if the nature of the beings admitted of it, the universe would be annihilated.

The object of the Christian religion, then, is not to establish any new moral law, but to explain and inculcate those which have existed since moral beings were first created. These laws are explained and enforced both by the precepts and examples of the Author of this religion. By the study of these precepts, the science of Christianity will be understood; by following his examples, these principles will be put into practice.

To understand fully the Christian science, a knowledge of all other sciences is necessary. To practise fully the art of Christianity, all other arts must be applied. It is evident that no christian can bring the principles of his religion fully into exercise, without constant aid from the art of printing. What missionary, what individual does not know, that the art of navigation has rendered powerful aid to the extension of the knowledge and practice of Christianity? Who does not know, that nearly all the useful arts are as necessary for accomplishing the purposes of the Christian religion, as for the acquisition of wealth, learning, power, or any other object of human pursuit?—Who does not see, that every steam-boat, railroad, and canal, may and ought to be used for the extension of knowledge? Is it not evident, that when all other science is applied to the development and diffusion of Christian science, and all other arts applied to bring into exercise the art or practice of Christianity, that the millennium will have arrived—that ignorance, crime, and poverty will have taken their flight from our earth—that every member of the human family will be happy?—that we shall have a heaven below? Who is not interested in understanding this science of sciences? Who will not BEGIN to practise this art of arts?

LAWS OF NATURE.

One of the most striking circumstances to which our attention is drawn when looking about us, is that all the various objects in Nature are, in some way or other connected. Not only is there a mutual dependence between being of the same species and things of the same kind, but also between animate and inanimate, the organized and the unorganized, &c. For example, when the earth is covered with snow, and all verdure but the evergreen has disappeared, we perceive upon the dry and withered rosebushes numerous little buds of a red color. Now the wintry wind which sweeps over these and the frost which shrivels them, renders them sweeter and more palatable, to the few birds whom the cold has not been able to destroy or drive to warmer climes. We cannot doubt that one purpose which these buds are designed to answer, and one object of the wind and frost is, thus to furnish acceptable food to the birds. And we here see an instance of this remarkable adaptation of one thing to another, which prevails throughout nature.

As all things have a fixed nature, or constitution, so their adaptation one to another is fixed. These adaptations are called *relations*, and from their being thus constant are generally designated *laws*. Thus when we speak of the *laws of nature* we merely allude to these various and well known relations. If a seed be placed in the earth we know that in vegetating, the *radicle* will incline downwards and the *plumule* upwards, and hence we call this well established fact a law of nature. The Creator has accordingly established *laws* with regard to human beings. These are of course very interesting to us whom they so nearly concern. To any infringement of them, punishment is affixed, and as they are independent of each other and invariable, it is in the highest degree important for us to know them and act in accordance with their dictates.

THE WORLD.

The process of enlightening, and elevating the world is both simple and easy; it is easy because it is simple. Among the eight hundred millions of minds upon the earth, there is scarcely one which may not be addressed on some point, so as to bring into a healthful exercise. One truly *Education Missionary*, by travelling among the western Indians, might bring many thousand minds into exercise in a single season, if he understood the natural and easy process of acting upon them. Another Missionary of the same kind by travelling through Africa, might throw action, and light into the dormant, dark mass of mind in that quarter of the globe. By a similar process followed up by other efforts, the benighted and dead mass of mind upon our whole globe, might receive light and life.

WRITING.

A few days since a little Miss from the country, of six years old, showed us a piece of her manuscript, which was much better than is often produced by school children of any age. The circumstance which is interesting in the case, is, that she acquired this skill principally in amusement exercises. Her mother gave her a slate and pencil when two years old, which she had continued to use both at home, and at school, until she could use it in various ways, both for her amusement and instruction.

The same little girl read better, and spelt better, and was more familiar with Geography, than most children at the age of twelve or fourteen years, which was principally the result of 'Intellectual Toys,' used in her home sports.

FAMILY APPARATUS.

A correspondent says that a set of Family Apparatus, aided by the Family Lyceum, has done more for his children in six months than schools have ever done in a year.

METALS.

NICKEL.

Nickel is a metal of great hardness, of a uniform texture and of a colour between silver and tin; very difficult to be purified, and magnetical. It even acquires polarity by the touch. It is malleable, both cold and red-hot; and is scarcely more fusible than manganese. Its oxides, when pure, are reducible by a sufficient heat without combustible matter; and it is little more tarnished by heating in contact with air than platina, gold, and silver. Its specific gravity, when cast, is 8.279; when forged, 8.666.

Nickel is commonly obtained from its sulphuret, the kufernicel of the Germans, in which it is generally mixed also with arsenic, iron, and cobalt. The alloys which it forms are but imperfectly known: they are brittle and hard, and have never been applied to any useful purpose.

POTASSIUM.

This metal was discovered by Sir H. Davy in 1807. He obtained it by submitting caustic potash to the action of voltaic electricity; the metal was slowly evolved at the negative pole. Potassium is a white metal of great lustre; it is ductile, and of the consistency of soft wax. It is lighter than water, its specific gravity being 0.85. When exposed to the air it instantly tarnishes, and must be kept in pure naphtha. It is a conductor of electricity. When thrown upon water, it acts with great violence, and swims on the surface, burning with a beautiful light of a red color. The water becomes a solution of pure potash.

On all fluid bodies which contain water, or much oxygen or chlorine, it readily acts; and in its general powers of chemical combination, says its illustrious discoverer, potassium may be compared to the alkahest, or universal solvent, imagined by the alchymists.

BISMUTH.

Bismuth is of a reddish white colour, and is usually found in silver and tin mines.

It is composed of broad brilliant plates adhering to each other, and is harder than silver. Its specific gravity is 9.882. Bismuth is not malleable; it is used chiefly in the composition of pewter, solder, printing types, &c.

ANTIMONY.

Antimony is a metallic ore, consisting of sulphur combined with the metal which is properly called antimony. Sometimes this sulphuret is termed crude antimony, to distinguish it from the pure metal, or regulus, as it was formerly called. According to Professor Proust, the sulphuret contains 26 per cent. of sulphur.

Antimony is of a dusky white colour, very brittle, and of a plated or scaly texture. Its specific gravity according to Brisson, is 6.7021 but Bergman makes it 6.86. Soon after ignition it melts, and by a continuance of the heat it becomes oxidized, and rises in white fumes, which may afterward be volatilized a second time, or fused into a hyacinthine glass according to the management of the heat: the first were formerly called argentine flowers of regulus of antimony.

In closed vessels the antimony rises totally without decomposition.

This metallic substance is not subject to rust by exposure to air, though its surface becomes tarnished by that means. Its oxides are a little soluble in water; and in this respect they resemble the oxide of arsenic, by an approach toward the acid state.

Antimony combines readily with the softer metals, and the alloys thus formed have been hitherto applied chiefly in the manufacture of music plates and printing types.

Medicine is indebted to antimony for some of its most active and valuable remedies. The acid of tartar forms with it the preparation called antimoniated tartrate of potass, formerly known by the name of emetic tartar.

ARSENIC.

Arsenic is generally found in combination with sulphur, oxygen, and many of the metals. When reduced to its pure metallic state, it is a friable, brilliant metal, of a bluish white colour, easily tarnishing, that is, oxydizing, by exposure to the air. In all its states it is poisonous. Arsenic is used to whiten copper, and it enters into most of the compositions for the specula of reflecting telescopes and for other optical purposes. Its oxides are employed in many processes of the dyer, also as fluxes for glass, and in several of the arts. The sulphurets of arsenic form valuable pigments of different colours.

COBALT.

Cobalt is a brittle, somewhat soft, but difficultly fusible metal, of a redish grey colour, of little lustre, and a specific gravity of 8.6. Its melting point is said to be 130° Wedgewood. It is generally associated in its ores with nickel, arsenic, iron, and copper; and the cobalt of commerce usually contains a proportion of these metals.

Cobalt is susceptible of magnetism, but in a lower degree than steel and nickel.

MANGANESE.

Manganese is a metal of a dull whitish colour when broken, but which soon grows dark by oxidation, from the action of the air. It is hard, brittle, though not pulverizable, and rough in its fracture; so difficultly fusible, that no heat yet exhibited has caused it to run into masses of any considerable magnitude. Its specific gravity is 8.0. When broken in pieces, it falls into a powder by spontaneous oxidation.

The black oxide of manganese is found very generally. It is procured in the greatest purity in the neighbourhood of Exeter, and is very much used for obtaining the oxygenated muriatic acid gas employed in bleaching. It is also used by glass-makers for destroying the green or yellow tint of glass; and for this reason has been called glass-maker's soap. It is also employed for giving a violet colour to glass and porcelain. In a metallic state it is of a grey colour, not at all malleable, and more infusible than iron.

When oxygen gas is wanted for philosophical experiments, the black oxide of manganese will be found to furnish it, at a cheap rate, in greater abundance than any other substance known to yield it.

CALORIC.

Caloric, or elementary fire, is the name now given by chemists to that element or property, which, combined with various bodies, produces the sensation of *heat*, while it is passing from one body to another.

This substance appears to pervade the whole system of nature. There are six different sources from whence caloric may be procured.

It may be produced by *combustion*, in which process the oxygen gas of the atmosphere is decomposed, and caloric, one of its component parts, set at liberty—by *friction*, or the rubbing of two substances against each other—by *percussion*, as the striking of steel against a piece of flint—by *the mixture of two or more substances*; as when sulphuric acid is poured upon water or magnesia—by *electricity* & *Galvanism*; the discharge of an electric or galvanic battery will produce a more intense degree of heat than any other means whatever. But the principal and probably the original source of caloric is the sun, which furnishes the earth with a regular supply for the support and nourishment of the animal and vegetable tribes. From this source it moves at the rate 195,000 miles in a second of time; for, it has been already stated, that the sun sends forth rays of heat which are distinct from those which produce illumination, and which accompany them in their course through the etherial regions. Caloric is the cause of *fluidity*, in all substances which are capable of becoming fluid. A certain portion, or *dose* of it, reduces a solid body to the state of an incompressible fluid; a larger portion brings it to the state of an aeriform or gaseous fluid. Thus, a certain portion of caloric reduces ice to a state of water; a larger portion converts it into steam or vapour. There is reason to believe, that the hardest rocks, the densest metals, and every solid substance on the face of the earth, might be converted into a fluid, and even into a gass, where they submitted to the action of a very high temperature. This substance is called *sensible* caloric, when it produces the sensation of *heat*; and *latent* caloric, when it forms an insensible part of the substance of bodies.

All bodies are, in a greater or less degree *conductors* of caloric. Metals and liquids are good conductors of heat; but silk, cotton, wool, wood, &c. are bad conductors of it.

For example, if we put a short poker into the fire at one end, it will soon become hot at the other; but this will not happen with a piece of wood of the same length, and under the same circumstances. A person with a silken purse, containing metal coin, may stand so near the fire, as to make the metal almost too hot to touch, though the temperature of the purse will apparently be scarcely altered. If a hand be put upon a hot body, part of the caloric leaves the hot body and enters the hand, producing the sensation of heat. On the contrary if a hand be put on a cold body, as a piece of iron, or another colder hand, part of the coloric contained in the hand leaves it to unite with the colder body, producing the sensation of cold. In short, caloric is diffused throughout all bodies, and enters into every operation in nature; and, were it not for the influence of this subtile fluid, there is reason to believe that the whole matter of the universe would be condensed into a solid mass.—*Dick's Christian Philosopher.*

TIN.

Tin is of a fine white colour, with a shade of blue: it has a slightly disagreeable taste, and when rubbed emits a peculiar smell. Its specific gravity when hammered is 7.229. It quickly tarnishes when exposed to the air; but is not altered when kept under water. It is the brightest of metals, and very ductile, but at the same time tenacious and flexible. It enters into combination with most other metals, and its alloys are highly useful in the manufacture of hardware goods.

PLATINA.

Pure or refined platina is by much the heaviest body in nature. Its sp. gr. is 51.5.

It is very malleable, though considerably harder than either gold or silver; and it hardens much under the hammer. Its colour on the touchstone is not distinguishable from that of silver. Pure platina requires a very strong heat to melt it; but when urged by a white heat, its parts will adhere together by hammering. This property, which is distinguished by the name of welding, is peculiar to platina and iron, which resemble each other, likewise, in their infusibility.

Platina is not altered by exposure to air; neither is it acted upon by the most concentrated simple acids, even when boiling, or distilled from it. Its ore has recently been found to contain, likewise, four new metals, palladium, iridium, osmium, and rhodium, —which see; beside iron and chrome.

METEOROLOGICAL DIARY, JANUARY, 1833.

Observations taken at 8 A. M., 2 & 6 P. M.

Days	Average.	Thermometer.			Wind.	Weather, &c.
1	66	63	70	66	SW SE	Cloudy.
2	69	66	72	68	SE E NE	Cloudy.
3	66	62	70	67	NE	Cloudy.
4	65	60	68	66	N N E	Cloudy.
5	68	64	72	68	NE	Cloudy.
6	68	66	70	68	SW SE SSE	Cloudy.
7	70	69	71	69	SW SE	Cloudy.
8	55	56	60	48	NW	Heavy rain.
9	55	52	60	52	SE SW	Cloudy.
10	43	44	48	36	SW W SW	Cv.; little snow.
11	33	20	42	37	SW	Clear.
12	43	40	48	42	W SW	Clear.
13	48	44	52	48	SW NW	Cloudy.
14	57	52	63	56	NE SE	Cv. Little rain.
15	60	51	66	62	SW NW	Cloudy.
16	62	62	66	58	NW N NW	Rain all day.
17	46	40	56	41	NW	Cloudy.
18	40	30	48	42	NW	Clear.
19	47	46	50	46	NW	Clear.
20	54	50	58	54	NE	Cloudy.
21	59	50	64	62	SE SW	Cloudy.
22	60	55	68	58	SW SE	Clear.
23	61	52	67	64	SW	Clear.
24	57	58	60	52	SW	Cloudy.
25	54	48	69	55	SW	Cloudy.
26	49	42	56	50	NW NE SE	Clear.
27	51	38	60	54	SW SE	Little rain. Cy.
28	55	48	60	57	SW SE	Cloudy.
29	61	58	66	60	SE	Rainy.
30	62	63	64	60	SE SW	Rain, thunder.
31	61	55	68	60	SW	Cy. High wind.

REMARKS FOR JANUARY, 1833.

1. These Observations have been taken three times a day, viz. at 8 A. M.; 2 & 6 P. M. 2 Mean of 3 daily Observations for the month 56°, 2° warmer than December. Max. 70° on the 7th, Min. 36° on the 11th. 3. Ther. Ex. at 8 o'clock A. M., Max. 69° on the 7th., Min. 29° on the 11th, Mean 52°. 4. Ther. Ex at 2 o'clock, P. M., Max. 72° on the 2d and 5th, Min. 42° on the 11th, Mean 60°. 5. Ther. Ex. at 6 o'clock P. M., Max. 69° on the 7th, Min 36° on the 10th, Mean 46°. 6. There have been 6 rains during the month. viz. on the 7th, 13th, 16th, 27th, 29th, and 30th. On the morning of the 10th, there was a little flurry of snow, the first we have had this winter, and will be probably the last. 7. Winds have been WNW 8 days, SSW 10 days, SSE 7 days, and NE 6 days — The weather has been clear 6 days, variable 8, cloudy 11, rainy 6. 8. The month has been uncommonly mild and pleasant. The health of the city continues as last reported. Yours, W. H. W.

Chatham Academy,
Savannah, Geo. Feb. 9th. 1833.

SNOW.

It never snows at Malta—Seldom at Beyroot. At Constantinople more or less falls every winter, but usually melts as soon as it touches the ground. Last winter (Feb. 14,) it fell 'midleg deep,' it seemed, says Mr. Goodell, like an old friend, 'And I went out into the midst of it, and introduced my children to it. They were delighted with its appearance. I set one of the youngest ones down a drift, and when he began to sink, he began to cry, and seemed to have no idea how deep he was likely to go. Many fine icicles were hanging this morning from the house, some of which I succeeded in getting, and presented to the children as old acquaintances of mine. These with a few snow-balls they took into the house to ascertain what they were, and what would become of them, when placed near the fire. And, when we witnessed the result, I reflected, how many of those we call our friends and acquaintances would if put to the trial, melt away in like manner.

HINDOO ASTRONOMY.

In answer to the proof of the convexity of the earth from the fact that it has been circumnavigated, the Hindoos say, 'This proof rests on the *testimony of foreigners.* Against this, we may bring the testimony of all the learned of our own country for many generations. They have testified that the earth is flat, and this testimony accords with our own observation. But further Europeans make a mistake in thinking that they circumnavigate a *globe*, whereas they merely sail round the Mount Maha Meru on a plain.'

BOSTON ACADEMY OF MUSIC.

A Society under the above title has made a most promising and most successful beginning towards accomplishing their object, which is to extend the practice of music through the community, especially in schools. A more animating exhibition cannot easily be imagined, than was presented on Thursday evening last by a juvenile choir of nearly three hundred singers, consisting of the pupils of Mr. Mason, whom the society has procured as their professor. Every individual of the great concourse of ladies and gentlemen present at this concert, must be ready to acknowledge that it is much easier for children to read and practise music, than the exercise of reading in common books. And facts fully prove that fewer children are incapable of learning to sing, than of learning to read. It is also proved, indeed it is evident without proof, that the moral tendency of music is truly happy.

OHIO LYCEUM.

Kirtland and Medina Lyceums, with many others in Ohio, are in a prosperous condition. Rev. Truman Coe, a highly skilful teacher recently from Connecticut, who established the Kirtland Lyceum, has been successful in awakening a general interest on the subject of education in many towns in that vicinity. A letter from him speaks most encouragingly of that part of the country.

The 'Farmer's Reporter,' published in Cincinnati, has a large circulation in Ohio, and the neighboring states. The editor, Mr. Barnum, the author of a useful and highly popular series of school books, recommends Lyceums to the particular attention of his readers. Mr. B. has succeeded in organizing an Agricultural Society in most of the seventy-three counties in the state, and is of opinion that County Lyceums may be established with equal ease and advantage.

CIRCUIT SCHOOLS.

We have just received a letter from a lady in the country, who says she has charge of three schools, which she teaches one month each, and is highly gratified with the experiment. This is one method of rendering teaching a profession, and one among several modes of circuit teaching.

SCHOOL LYCEUMS.

Mr. Brown of this city has a Lyceum connected with his school, which has a valuable cabinet of natural and artificial productions. The different members of the Lyceum give lectures, and perform experiments one evening in a week in presence of the other pupils, and their friends who are invited.

SCHOOL AGENT SOCIETY.

We are glad to learn from several ladies, as well as many gentlemen, that they design to attend the meeting of the School Agent Society, to be held at Andover on the 27th of this month.

GEOLOGICAL SURVEYS.

Measures are in progress by the Legislature of Maryland to procure a geological survey of that state, similar to the one already made of Massachusetts. This is a highly important step for Maryland, on account of its great riches in the mineral kingdom, many of which have already been applied to their appropriate uses in the arts.

We hope other, and all the states will go and do likewise, until every Capitol and every school room in our Union has its cabinet of Natural History.

BOOK OF NATURE.

THE USES OF FISHES.

Although it has been said that to preserve their own existence, and to continue it to their posterity, fills up the whole circle of their pursuits, and that a ceaseless desire of food seems to be their ruling impulse, yet we are not to consider Fishes as insulated creatures, unconnected with the general concerns and affairs of the world; as merely formed for the propagation of their kind, and to 'pursue and be pursued, each other's prey.' No; these also act an important and most essential part in the great theatre of the universe; and woe be to the inhabitants of the earth, did multitudes of fishes not abound in its waters. We have already had occasion to notice the necessity of a speedy decomposition of the parts of putrescent bodies on land, and notwithstanding the saline quality of its waters and perpetual agitation which prevents them for a time, the bad effects of such accumulated loads of filth and nastiness, as are continually pouring into the sea, must soon be apparent, were it not for those numerous herds of fishes, which in every quarter glide with rapidity through the liquid expanse, and catch and devour almost every thing of a digestible nature that comes in the way. For this purpose, that amazing fecundity may have been bestowed upon them, and for this purpose those voracious appetites given, that, however remote the situation, or disgusting the substance, that enters the watery element, it might quickly meet an eye eager to catch it, and a living tomb to swallow and strip it of its noxious qualities.

As an article of food the finny tribes are greatly to be prized, and it is matter of thankfulness, that the benefits they impart are most extensively diffused; for while our lakes, and rivers, and streams, abound with these living treasures, the ocean conveys them in myriads to the ends of the earth, and presents the bounties of an indulgent parent to his numerous children, however scattered among the isles of the sea; and if the Turbot has been styled for its exquisite relish *the Pheasant of the waters*, the Sturgeon, even in pickle, has been denominated a royal luxury, and while the salmon is held in much esteem by the great, the poor have reason to praise the Almighty for an abundant supply of cheap, wholesome, and nutricious food, in those prodigious shoals of Herrings and Pilchards which visit our coasts.

When the great colony of Herrings set out on their migrating journey from the Polar seas, it is composed of such numbers, that if all the horses in the world were loaded with them, they could not carry the thousandth part; and when the main body approaches the coast, it is generally divided into distinct columns of five or six miles in length, and three or four in breadth!

Vast shoals of Pilchards (a small species of Herring) appear about the middle of July, off the coast of Cornwall; and Mr. Pennant was assured by Dr. Borlase, that on the fifth of October, 1767, there was at one time enclosed and caught in St. Ann's Bay, no less than 7000 hogsheads of Pilchards, each hogshead containing 3500 fishes!

Nor have we less reason to be thankful for the incalculable number of Cod, and other white fish, which are drawn from the ocean; and for those inexhaustible stores of cartilaginous flat fish, which furnish the laborer with his cheap repast.—In 1806, five hundred and seventy-seven ships, carrying about 64,667 tons, and navigated by 4336 men, were employed by the British Government, to export the produce of the fisheries on the banks of Newfoundland, where the principal cod-fisheries are. The vessels used in the fishery, are from 100 to 150 tons burden, and catch from thirty to forty thousand fish each; 10,000 persons being employed about this fishery, in catching, salting, and drying the fish, which are sent to all parts of Europe and the West Indies. These fisheries are said to bring into the proprietors a revenue of several millions yearly; and they will probably remain an inexhausted and inexhaustible source of treasure, when the richest mines are wrought out. Happy ordination of infinite goodness and unerring wisdom, that while the monstrous and unwholesome tribes are thinly scattered or hid from our sight in the great abyss, the wholesome and nutritious kinds abound in such numbers, and are brought, as it were, to our very doors.

Even the Greenland Whale, which abounds in such numbers in the Northern ocean, is said to furnish the inhabitants of those countries, which border on his haunts, with a delicious luxury in the article of food. The Porpoise was a royal dish even so late as the reign of Henry VIII, and the negroes are said to be fond of the flesh of the voracious Shark.

The Whale is well known on account of its importance in furnishing such a supply of oil and whalebone. Every Whale yielding on an average, from sixty to one hundred barrels of oil; which, with the whalebone, a substance taken from the upper jaw of the animal, must render these creatures very valuable in a commercial point of view. From the Cacholet we derive that valuable commodity spermaceti; and ambergris, the sweetest of perfumes, is also frequently found in this animal. The skin of the Shark is converted into shagreen. From a species of the Sturgeon, we are supplied with isinglass. From the Beluga-fish we derive that delicious composition called caviare, and also the Beluga-stone! The hide of the Huso is so tough and strong, that it is employed for ropes in carts and other wheel carriages.

As some of the volatile race seem to be formed to please us with the beauty of their plumage, and delight us with the melody of their song, so a few of the finny tribe are so exquisitely formed and beautifully embellished, that they appear more calculated for our pleasure and pastime, than for any intrinsic value in another point of view. We do not here merely allude to the little gold and silver natives of China and Japan, which are trained and domesticated to sport in our ponds, and amuse us with gambols in our gardens, but to the Dorado and Gilt-head, which glide in the ocean, and the beautiful Dragonet, which shines resplendent in the deep. These, also, on some interesting occasions, may contribute their mites towards the comforts of man. Gazing on these from the side of a vessel that conveys him far from his native home, the solitary exile may be made for awhile to forget his private woes; and the sporting of these may serve to beguile the tedious moments that mark the slow progress of the lonesome passenger, returning from captivity to the circle of his friends, or to the agitated bosom of her he loves.

Thus if we have had reason to admire the wisdom, the power, and the goodness of the great Creator, as they are manifested in some of the inanimated pages of the Book of Nature, and to contemplate as we have gone along, with sentiments of admiration and gratitude, the benefits we derive from the internal structure and outward form of the earth—from the numerous appendages and vegetable productions by which the dry land is covered—and from the wonderful phenomena and beneficial properties of the ocean, we have no less cause to be filled with admiration at the bright display of the wisdom and goodness of the Creator, as they shine conspicuous in the inhabitants of the great deep.

THE ATMOSPHERE.

'To Him, ye vocal gales
Blow soft, whose spirit in your freshness breathes!'
'We view his kind, his life-preserving care
In all the wondrous properties of air.'

From the earth let us ascend into the region of the air, and take a view of that invisible fluid that surrounds our globe as with a garment, gravitates to its surface, enters into its pores, revolves with it in its diurnal motion, and circles along with it in its annual course.

The *Air* is one of the most heterogenous mixtures imaginable. 'In it,' says Goldsmith, 'all the bodies of the earth are continually sending up a part of their substance by evaporation. A thousand substances that escape all our senses we know to be there; the powerful emanations of the loadstone, the effluvia of electricity, the rays of light, and the insinuations of fire.' Such are the various substances through which we move, and which we are continually taking in at every pore, and returning again with imperceptible discharge! yet, notwithstanding the multitude of discordant particles of which the atmosphere is composed, it is made wonderfully to harmonise in point of utility; and is wisely contrived, admirably framed, and excellently constituted, for the various purposes it was intended to perform, in the world of nature and of art.

That the air is a *fluid* is obvious, from its possessing so many properties in common with other fluids; yet in one respect it is wisely made to differ from all others, being incapable of freezing by the greatest degree of cold. Was it not for this singular quality of the atmosphere, what dreadful effects must have been the consequence. Life and animation must long ere go have ceased, before the frigid blasts of the north, and when winter first shook his hoary locks, the great pulse of nature must have stood still!

Another wonderful property of the air is its *invisibility;* for although it can be *heard* in the howling of the tempest, and *felt* in the pressure of the gale, and notwithstanding the number of bodies that continually mix with its substance, it is still too fine to be seen by the sharpest eye.

Every object around us is visible, except the air! and happy it is for us that it is so; for had it been otherwise, farewell to all the delightful prospects that charm the eye; farewell to all the bright beauties of creation. Nature must have put on a sombre aspect, and instead of those delightful regions of light and cheerfulness in which we are placed, our habitations would have been surrounded by the doleful shades of a dusky covering, and environed with a mantle of darkness and despair.

But although the atmosphere is of itself invisible to the sight, it is the happy medium of light and heat. The air is found to moderate the rays of light, to dissipate their violence, and to spread an uniform lustre over every object. Were the beams of the sun to dart directly upon us, without passing through this protecting medium, they would either burn us up at once, or blind us with their effulgence; but by going through the air, they are *reflected*, *refracted*, and turned from their course a thousand different ways, and thus are more evenly diffused over the face of nature. But this is not all, for by means of the air the beams of the sun are not only rendered tolerable, and the rays of light more copiously diffused throughout creation, but the advantages of heat and light are lengthened and prolonged. By the reflective property of this fluid, which must always be in proportion to its density, the heat of the sun, although duly attempered, must be more sensibly and uniformly felt nigh the surface of the earth, than in the higher regions of the atmosphere; while to its refractive quality, we are beholden for the *twilight*, or that surprising phenomena of nature, by which we enjoy the real presence of the sun when he is actually below the horizon! For the better understanding of this, let any person put a shilling into a bason, and then retire until he can just observe its outer edge visible over the inner edge of this vessel; in that position let some person fill up the bason with water, the *whole* shilling, by being seen through a denser medium, will instantly become visible to the person who could only before observe its outer edge.

Were it not for the reflective quality of the air by which indeed *the light is parted*, we should behold the sun in his splendor, and observe a brightness in that part of the heavens in which he happened to be, but on turning round how cheerless would be the prospect; there darkness visible would reign in the heavens, although the stars and planets would glimmer at noon day; and were it not for the refractive property of this fluid, by which the oblique rays of the great luminary are broken off from a straight course, and turned towards the earth, the transition from the horrors of night to the light of day must have been *instantaneous*, and instead of those beneficial harbingers, by which the outgoings of the morning and evening are made to rejoice, and the long and dismal nights of the polar regions stript of their horrors, the optic nerves would have been overpowered by the sun rising in all its glory, and the moment he sunk beneath the horizon, the bewildered traveller left to grope in the dark.

Although the air cannot be frozen or perceived, by the eye, for the wise reasons already noticed, yet it is capable of being condensed and rarefied to an astonishing degree. So much so, that the air in the house may be compressed so as to be made to enter a cavity not larger than the eye of a needle; and the contents of a nut shell so expanded, as to fill a sphere of unknown dimension! If an empty bladder, with its neck tied close, is laid before the fire, the heat will so rarefy the small quantity of inclosed air, as to make it extend the bladder to its full dimensions, and if not then timeously removed, will at last break it with the report of a gun. Sir Isaac Newton thinks the air capable of diffusing itself into above a million of times more space than it before possessed! By these remarkable properties of the air, together with its weight and elasticity, it is admirably fitted for some of its most essential uses, and, perhaps, none more so than for the business of animal respiration; for in this act, so necessary for the prolongation of life, the air, by its weight and condensing power, is forced and compressed into the lungs, while by its elastic and expanding property, it is thrown out again in the act of breathing.

Perhaps some of our readers may be surprised at the bare mention of the weight of a substance, which has been proverbially compared to a trifle for its lightness, and they may wonder still more when we speak of its elasticity, when they have been taught to consider it an unresisting medium; but what will such think when we boldly assert, that we are literally plunged into a sea of air, and of such gravity and pressure, as to be equal, on the body of a man of moderate size, to the weight of 20,000 lb. 'Tremendous consideration,' says the reflective Hervey, 'should the ceiling of a room, or the roof of a house, fall upon us with half that force, what destructive effects must ensue! Such a force would infallibly drive the breath from our lungs, or break every bone in our bodies; yet so admirably has the divine wisdom contrived this aerial fluid, and so nicely counterpoised its dreadful power, that we receive not the slightest hurt; we suffer no manner of inconvenience, we even enjoy the load. Instead of being as a mountain on our loins, it is like wings to our feet, or like sinews to our limbs. Is not this common ordination of Providence thus considered something like the miracle of the burning bush; whose tender and combustible substance, though in the midst of flames, was neither consumed nor injured?'

But how are we to account for this miraculous preservation?—It is owing to the elasticity or spring of the internal air within all bodies, which, although small in proportion, is wisely made to balance, resist, and equiponderate that which is without, notwithstanding the height of its column.

The elasticity and resistance of the air, perhaps, cannot be demonstrated by a more simple experiment, than by pressing with the hand on a bladder with which it is confined; and the weight and pressure of the atmosphere may be explained without the aid of the air pump or other philosophical instrument, merely by taking a common saucer, filled with water, and turning down a tea-cup into it, with a piece of flaming paper inside. As the fire destroys the internal air in the cup, a sort of vacuum will take place, and the pressure of the outward air on the water in the saucer will make it disappear and fill up.

Although, in casting our eyes upwards, we do not observe any boundary to the vast expanse, we are not to consider that the atmosphere is unlimited. On the contrary, we are taught by the most rational calculation, that if it extends much beyond forty-five or fifty miles, it becomes so exceedingly rare, as to be unfit for the purposes for which the lower regions are so well adapted. The atmosphere, at the height of fifty miles, is said to be so rare, that it has no sensible effect on the rays of light. At the height of forty-five miles it loses the power of refraction; at forty one miles it is supposed to be rarefied to that degree as to occupy three thousand times the space it does here; and Dr. Gregory observes, that it is generally agreed that there are no clouds at the height of four or five miles.

It is seldom indeed sufficiently dense at the height of two miles to be able to bear up the clouds, so that to whatever perfection our modern aeronauts may bring the art of balloon-navigation, there is not the smallest probability of their being able to escape from the earth to another planet. The atmosphere has its limits as well as the ocean, and not only are those massy bodies that are made to move in the lower parts of this great out-globe, confined by laws, firm as chains of adamant, but the thinnest vapor, the minutest atom, the most subtile effluvia that ascends the higher regions, and gain, as it were, the outskirts of creation, are checked in their career by the powerful mandate of the Creator, and forced to return and execute his orders.

Happy indeed for the world is this ordination, for if the philosophic axiom be true, that things must continue as at the beginning with respect to the quantity of matter contained in the universe, and that if it were possible that a single atom could be lost, the harmony of creation would be destroyed, what direful consequences must ensue, were the daring spirits of adventurous men not confined by unalterable laws, and the imperceptible atoms which float in the atmosphere not laid under restraint, by that command which says to the troubled waves of the ocean, 'Hitherto shalt thou come, and no farther.'

LADIES' LYCEUMS.

It is fully proved by experiment, that primary schools, especially during the summer season, can be more improved by associations of ladies, than by any other means. There probably is not a town in New England or the northern states, where a few ladies might not be found who were fully competent to the undertaking, and who would esteem it a pleasure as well as a duty, to associate for the purpose of visiting schools and encouraging teachers, by inviting them to meet each other, with any other ladies who might wish for their own improvement, or the improvement of their schools.

Such meetings of ladies, including teachers, one afternoon in a week, during the summer, for reading, conversation, and such other exercises as they might deem expedient for the improvement of themselves and of their schools, would be of incalculable benefit to society at large, and especially to the rising generation.

So easy is this measure in its execution, and so immensely important would it be in its results, as to recommend some general arrangement for bringing it forward early in the spring, in all our towns and villages throughout the Union.

How can the ladies of our cities do a greater service to themselves or the community, than by a prompt movement for leading the way in this subject?

QUESTIONS ON LYCEUM No. 29.

When was the School Agent Society organized, and what are its objects?

How does this society propose to effect its objects?

Is the *self-supporting* principle embraced in its plan?

What remarkable instances of spectral illusion are mentioned as having occurred in Edinburgh?

What was the cause of these and other instances of spectral illusion?

What elementary principles of Geometry connected with the Alphabet, may be presented to the minds of children for their instruction and amusement?

What three kinds of angles are contained in the letters of the Alphabet?

How many kinds of lines, and what are they?

In how many different positions are lines placed?

Are the lines composing W horizontal, vertical, or oblique?

How many lines in M are vertical, and how many oblique?

In X how many acute and obtuse angles?

Which letters are composed of one straight line?

By whom were the address and poem delivered before the Mechanic Apprentices Library Association in Boston?

What different objects and exercises are embraced by this society?

Has the society been more or less prosperous, since it became independent of the Mechanics' Charitable Association?

Is their Library more or less read since they have held meetings for study and mutual improvement?

Have their meetings for mutual improvement brought into use some books which were before neglected?

What is the constant covering of the highest mountains in Iceland?

For what is the calcareous spar, found there, distinguished?

To what disaster has Iceland been subject?

What was the number of horses, cattle, and sheep on this island, in 1784?

What is the character of the Icelanders?

What combustible is found deposited in the earth on this island?